PACIFIC NORTHWEST FOREST AND RANGE EXPERIMENT STATION

USDA FOREST SERVICE RESEARCH NOTE

PNW-189 online September 1972

FURNISS
Card ✓

# KEY TO ADULT BARK BEETLES COMMONLY ASSOCIATED WITH WHITE SPRUCE STANDS IN INTERIOR ALASKA

by

Roy C. Beckwith, *Principal Entomologist*

ABSTRACT

A dichotomous key enables the determination of adult Scolytidae commonly found in white spruce stands in interior Alaska including the Kenai Peninsula. Schematic drawings are included.

Keywords: Scolytidae, bark beetle, *Picea glauca*, white spruce, Alaska.

The family Scolytidae contains some of the more destructive forest insects in North America, especially in western coniferous forests. Many species of bark beetles infest spruce in interior Alaska; however, their distribution and importance are not well documented due to the difficulty of collecting over the large, often inaccessible land area. The insects are small, and their subcortical habitat makes them inconspicuous. Most species are collected from dead and dying trees during investigations of damaged stands.

Proper identification of a species is necessary to determine its present or potential importance. Some, such as the spruce beetle, *Dendroctonus rufipennis* (Kby.), can kill living trees, particularly those weakened by some factor or combination of factors. Other species are not of economic importance and simply aid in the breakdown of woody material.

The following simplified key was devised to help those interested in identifying bark beetles associated with white spruce stands in interior Alaska. The

terminology follows that used by Swaine.[1] The various species of *Ips* were separated according to Hopping.[2] All characters are easily seen with an ordinary dissecting microscope. The material for the key was collected over a 3-year period in the Tanana River Valley and on the Kenai Peninsula. Species collected in interior Alaska and the known Alaskan hosts, including hosts in southeastern Alaska, are listed below:

| SPECIES | HOST |
|---|---|
| *Scolytus piceae* | *Picea glauca; Larix laricina* |
| *Crypturgus borealis* SW | *Picea glauca; P. sitchensis* |
| *Polygraphus rufipennis* (Kirby) | *Picea glauca; P. sitchensis;* |
| *P. convexifrons* Wood | *P. mariana; Pinus contorta* |
| *Phloeotribus puberulus* / *lecontei* Schedl | *Picea glauca* |
| *Dendroctonus rufipennis* (Kirby) | *Picea glauca; P. sitchensis;* |
| *D. punctatus* LeC | *P. Xlutzii* |
| *D. simplex* LeC | |
| *Phloeosinus alaskanus* pini SW | *Picea glauca* |
| *Scierus annectens* LeConte | *Picea glauca* |
| *Trypodendron lineatum* (Olivier) | *Picea glauca; P. sitchensis;* |
| | *Tsuga heterophylla* |
| *Cryphalus ruficollis* Hopk. | *Picea glauca* |
| *Pityophthorus* spp. | *Picea glauca* |
| *Ips perturbatus* | *Picea glauca; P. sitchensis* |
| ~~*Ips amiskwiensis*~~ | *Picea glauca* |
| *Ips semirostris* | *Picea glauca* |
| *Ips borealis* boreal's SW | *Picea glauca* |
| *Dryocoetes affaber* (Mann.) | *Picea glauca; P. sitchensis;* |
| *Ips concinnus* (Mann.) | *Tsuga heterophylla; Pinus contorta* |
| *Dryocoetes autographus* (Ratzeburg) | *Picea glauca; P. sitchensis* |
| *Orthotomicus caelatus* (Eichhoff) | *Picea glauca; P. sitchensis;* |
| *Ips mexicanus* (LeC.) DEB | *P. mariana; Pinus contorta* |
| *Hylurgops rugipennis* (Mann.) DER | |
| *Lymantor alaskanus* Wood | |
| *Trypophloeus striatulus* | |
| *Trypodendron betulae* SW | |
| *I. retusum* (LeC.) DEB | |
| *Ips tridens engelmanni* & *I. t. tridens* | |
| *Xylechinus montanus* Blackman DEB | |

*Ips pini* (Say) DEB (1)

*Gnathotrichus retusus* (LeC.) ? DEB (map) (1)

*Pseudohylesinus grandis* SW DEB

2 *P. sitchensis* SW DEB.

*P. sericeus* (Mann.)

*Alniphagus aspericolis* (LeC.)

*Carphoborus andersonii* (SW)

*C. ponderosae carri* SW

+ check wood - may be pini ha.

[1] J. M. Swaine. Canadian bark beetles. Part II. A preliminary classification, with an account of the habits and means of control. Tech. Bull. Dominion Can., Dep. Agric. 14, 143 p., 1918.

[2] G. R. Hopping. The North American species in group VI of Ips De Geer (Coleoptera: Scolytidae). Can. Entomol. 97: 533-541, illus., 1965.

G. R. Hopping. The North American species in group VII of Ips De Geer (Coleoptera: Scolytidae). Can. Entomol. 97: 193-198, illus., 1965.

G. R. Hopping. The North American species in group VIII of Ips De Geer (Coleoptera: Scolytidae). Can. Entomol. 97: 159-172, illus., 1965.

## KEY TO ADULT BARK BEETLES

1. Fore tibia terminating in a prominent curved spine at the outer apical angle (fig. 1); abdominal venter ascends abruptly; medial spine present on the second abdominal sternite (see also fig. 12)[3/] . . . . . *Scolytus piceae* (Sw.)

1. Fore tibia not terminating in a prominent curved spine at the outer apical angle (fig. 2); abdominal venter convex, not ascending abruptly; medial spine absent . . . . . 2

    2. Base of head visible from above (fig. 3); pronotum not noticeably roughened in front . . . . . (Hylesininae) 3

    2. Head concealed from above (fig. 4); pronotum noticeably roughened in front . . . . . (Ipinae) 7

3. Eye divided; antennal club unsegmented (fig. 14) . . . . . *Polygraphus rufipennis* (Kby.)

3. Eye not divided; antennal club segmented . . . . . 4

    4. Antennal funicle seven-segmented . . . *Scierus annectens* Lec.

    4. Antennal funicle five-segmented . . . . . 5

5. Antennal club sublamellate (fig. 15) . . . . *Phloeotribus puberulus* LeC.

5. Antennal club connate (figs. 16, 17) . . . . . 6

    6. Fore coxae narrowly separated (fig. 5); elytral interspaces not elevated . . . . *Dendroctonus rufipennis* (Kby.)

    6. Fore coxae widely separated (fig. 6); elytral interspaces elevated, especially on the declivity . . . . . *Phloeosinus alaskanus* Blkm.

7. Eye divided; antennal club unsegmented. . . *Trypodendron lineatum* (Ol.)

7. Eye not divided; antennal club usually segmented . . . . . 8

    8. Antennal funicle two-segmented (fig. 13); small species, about 1 mm. long . . . *Crypturgus borealis* Sw.

    8. Antennal funicle more than two-segmented; moderate (1.5 mm.) to large in size . . . . . 9

9. Antennal funicle four-segmented . . . . . *Cryphalus ruficollis* Hopk.

9. Antennal funicle five-segmented . . . . . 10

    10. Elytral declivity unarmed . . . . . 11

    10. Elytral declivity armed with three or more tubercles or teeth (figs. 9, 10, 11). . . . . 13

[3/] For convenience of readers in making comparison, figures are not mentioned consecutively.

11. Pronotum evenly convex, not declivous anteriorly (fig. 7), granulated on entire surface . . . . . (Dryocoetes) 12

11. Pronotum precipitous anteriorly (fig. 8), punctured on caudal area. . . . . *Pityophthorus* spp.

12. Pronotum widest near middle, sides arcuate; large species, greater than 3.5 mm. long . . . . . *Dryocoetes autographus* Ratz.

12. Pronotum widest at base, sides nearly parallel; medium size species, less than 3.5 mm. long . . . . . *Dryocoetes affaber* (Mann.)

13. Antennal club obliquely truncate; third declivital tooth displaced mesally . . . . . *Orthotomicus caelatus* (Eichh.)

13. Antennal club flattened; all teeth on summit of lateral margin . . (*Ips*) 14

14. Lower part of frons protuberant; third declivital spine conical (fig. 11) . . . . . 15

14. Lower part of frons not protuberant (figs. 9, 10) . . . . . 16

15. Lower part of frons covered by a dense brush of hair or a short compact pile . . . . . *Ips amiskwiensis* Hopp.

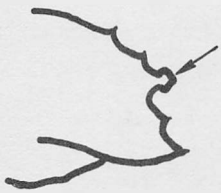
15. Lower part of frons without setal brush, a few scattered setae may be present . . . . . *Ips semirostris* Hopp.

16. Third declivital spine capitate and acute at tip (fig. 9); face rough appearing, usually two larger tubercles in the medial area; larger species, greater than 4 mm. long . . . . . *Ips perturbatus* (Eichh.)

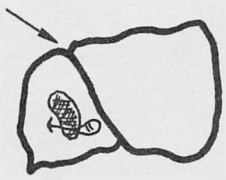
16. Third declivital spine triangular (fig. 10); face smooth and shiny; small species, less than 4 mm. long. . . . . *Ips borealis* Sw.

1

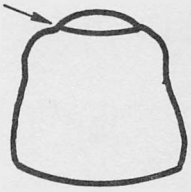
2



9

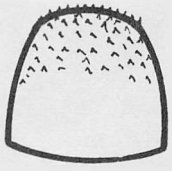


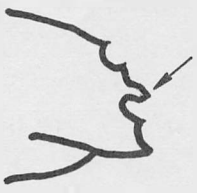
3



10

4



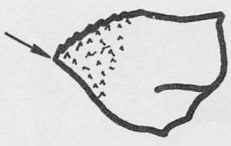


11

5

6

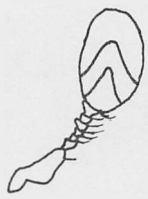
7



8

EXPLANATION OF FIGURES:

1. Fore tibia of *Scolytus piceae*
2. Fore tibia of *Ips* sp.
3. Schematic drawing of a Hylesininae
4. Schematic drawing of an Ipinae
5. Schematic drawing of *Dendroctonus* coxal cavity
6. Schematic drawing of *Phloeosinus* coxal cavity
7. Profile of *Dryocoetes* pronotum
8. Profile of *Pityophthorus* pronotum
9. Declivital armature of *Ips perturbatus*
10. Declivital armature of *Ips borealis*
11. Declivital armature of *Ips amiskwiensis*.

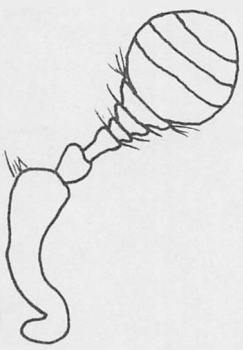


12

13

14

15



16

17

18

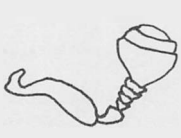
19

20

21

22

23



24

FIGURES 12-24, Scolytid antennae:

12. *Scolytus piceae*
13. *Crypturgus borealis*
14. *Polygraphus rufipennis*
15. *Phloeotribus puberulus*
16. *Dendroctonus rufipennis*
17. *Phloeosinus alaskanus*
18. *Scierus annectens*
19. *Trypodendron lineatum*
20. *Cryphalus ruficollis*
21. *Pityophthorus* sp.
22. *Ips* sp.
23. *Dryocoetes* sp.
24. *Orthotomicus caelatus*.

The mission of the PACIFIC NORTHWEST FOREST AND RANGE EXPERIMENT STATION is to provide the knowledge, technology, and alternatives for present and future protection, management, and use of forest, range, and related environments.

Within this overall mission, the Station conducts and stimulates research to facilitate and to accelerate progress toward the following goals:

1. Providing safe and efficient technology for inventory, protection, and use of resources.
2. Development and evaluation of alternative methods and levels of resource management.
3. Achievement of optimum sustained resource productivity consistent with maintaining a high quality forest environment.

The area of research encompasses Oregon, Washington, Alaska, and, in some cases, California, Hawaii, the Western States, and the Nation. Results of the research will be made available promptly. Project headquarters are at:

Fairbanks, Alaska
Juneau, Alaska
Bend, Oregon
Corvallis, Oregon
La Grande, Oregon
Portland, Oregon
Olympia, Washington
Seattle, Washington
Wenatchee, Washington

The FOREST SERVICE of the U.S. Department of Agriculture is dedicated to the principle of multiple use management of the Nation's forest resources for sustained yields of wood, water, forage, wildlife, and recreation. Through forestry research, cooperation with the States and private forest owners, and management of the National Forests and National Grasslands, it strives — as directed by Congress — to provide increasingly greater service to a growing Nation.

GPO 986-685